

The present invention relates to a door with a flexible  
folding shutter and a device for guiding the door  
5 shutter.

In the field of flexible shutter doors, there are doors  
called roller doors in which a flexible shutter rolls  
up on a shaft and doors called folding doors in which,  
10 when the shutter is opened, the latter folds  
concertina-like at the top of the door.

The doors of the latter type have, schematically, two  
vertical slides at the top of which is placed an  
15 electric motor-driven shaft. The shutter is suspended  
on a transverse bar situated below the roller shaft and  
has at its bottom end a sill bar. Two vertical and  
parallel straps attached, first, to the sill bar and,  
secondly, to the roller bar make it possible to raise  
20 the shutter when the shaft is set in rotation.

The shutter in its raised position is amassed  
concertina-like in the top portion of the door and  
opens the passage.

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Usually, the shutter is provided with several sheaths  
in which stiffening bars are inserted.

A major problem that is posed for these doors is that  
30 of managing the seal between the lateral edges of the  
shutter and the vertical uprights.

Specifically, to receive the shutter in the top  
position, the slides usually have a C-shaped cross  
35 section whose two flanges are 300 to 600 mm apart. This  
distance makes it possible to receive, between the two  
flanges of the upright, the concertina-like folds of  
the shutter when it is raised.

The consequence of the large opening of the uprights is that, when the wind blows, the shutter tends to rattle and an exchange of air is generated via the lateral edges of the latter.

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The invention aims to remedy these disadvantages and its object is to improve the seal of a folding door.

10 For this purpose, the subject of the invention is a door comprising, in a manner known per se, two vertical slides and at least one flexible shutter capable of being folded in the upper part of the slides, having at least one transverse stiffening bar.

15 According to the invention, a guide device is engaged in the extension of at least one stiffening bar producing a shutter guide in at least one of the slides in a plane offset relative to the plane of the shutter, the shutter being pressed against a surface of the  
20 slide.

Thus, the basic idea of the invention consists in providing a shutter guide to prevent the latter from rattling when it is exposed to gusts of wind, this  
25 guide being offset relative to the plane of the shutter to allow a surface pressure of the shutter on a surface of the slides. This pressure of the shutter against a surface of each slide prevents the generation of an exchange of air at the lateral edges of the shutter.  
30 This arrangement is totally noteworthy since it allows the shutter to be folded in the top part of the door and outside the slide, while retaining the seal.

According to an advantageous embodiment, the guide  
35 device has at least one guide member whose axis is offset relative to the plane of the shutter.

For the shutter to be folded harmoniously, the connection between the guide device and the stiffening

bar allows the guide device to rotate relative to the stiffening bar.

To prevent an accidental action against the shutter  
5 from causing damage that is costly to repair thereon,  
at least one of the connections between the guide  
devices and, first, the stiffening bar and, secondly,  
the slide is capable of dislocating without an external  
action exceeding a predetermined value. Thus, before a  
10 permanent deformation of the stiffening bar or of the  
slide, the guide device breaks to prevent irreversible  
damage to the door. Preferably, the guide device (14)  
has at least one breakaway or deformation zone likely  
to disengage the guide device from the stiffening bar  
15 (12) or from the slide (2).

According to a possible embodiment of the door in which  
it comprises two parallel shutters, the latter  
comprises a guide device that can engage with a  
20 stiffener belonging to each of the shutters, having at  
least one guide member offset relative to the plane of  
each of the flexible shutters.

In this possible embodiment, a link strut connects two  
25 stiffening bars, which makes it possible to create an  
assembly of high inertia while having a limited mass.

Preferably, each of the slides has a first flange  
against the outer face of which the shutter presses and  
30 a second flange delimiting with the first flange a  
groove receiving a guide member of the guide device.

In addition, the shutter has a window at the end of  
each stiffening bar through which the guide device  
35 protrudes.

The invention also relates to a guide device that  
comprises a body having

at one of its ends, at least one means of engagement with a stiffening bar, and, at its second end, at least one guide member whose axis is offset relative to the axis of the means of engagement with the stiffening  
5 bar.

There again, the basic idea of the invention re-emerges, since the guide device makes it possible to provide a shutter guide in a plane offset relative to  
10 the very plane of the shutter, which makes it possible to make a space allowing the latter to be pressed against a surface of a slide.

According to a possible embodiment, the guide device  
15 consists of a body having a large base and a small base that are parallel and connected by a semicylindrical wall perpendicular to the two bases, the large base being fitted with at least one guide member and the small base having a blind hole capable of receiving a  
20 stiffening bar.

Advantageously the guide members comprise:

- a ring having a semicylindrical wall placed in the extension of the semicylindrical wall and a flat  
25 wall, and
- a rotary roller.

The semicylindrical ring extends the stiffening bar and thus prevents folds from forming in the shutter of the  
30 shutter at the end of the latter.

Advantageously, the semicylindrical ring encloses a roller.

35 According to another possible embodiment, the guide members consist of two rollers oriented in a V-formation one relative to the other, capable of pressing against a rib having a V-section.

In the case of a door having two parallel shutters, the guide device comprises a body having a large base and two small bases symmetrical relative to the mid-plane, each of the bases being connected to the large base by a semicylindrical wall, the large base being fitted with at least one guide member and each of the small bases having a blind hole capable of receiving a stiffening bar.

- 10 In this case, according to one possibility, the guide members comprise
- a rotary roller, and
  - two rings symmetrical relative to the rotary roller having a semicylindrical wall placed in the extension of the semicylindrical wall and a flat wall.
- 15

To be correctly understood, the invention is described with reference to the drawings here attached representing as nonlimiting examples several embodiments of folding doors and of guide devices according to the latter.

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Figure 1 represents a door seen from the outside with the shutter partially pulled away at the end of the stiffening bars,

25 figure 2 represents in perspective, from the internal zone delimited by the door, two guide devices engaged in a slide,

figure 3 represents in perspective and in section the guide device engaged in a slide,

30 figure 4 is a view in cross section at the end of a stiffening bar,

figure 5 is a view also in perspective along V-V of figure 2,

35 figure 6 represents the section VI-VI of figure 4,

figure 7 represents a variant embodiment of the guide device,

figure 8 represents in section another possible embodiment of the guide device,

figure 9 represents in section a door having two parallel shutters.

For simplification purposes, the items that recur in these different embodiments or that are similar from one embodiment to another are identified by the same reference numbers.

With reference first of all to figure 1, it can be seen that the guide device according to the invention finds its application for a door comprising two lateral slides 2 supporting a roller shaft at their top end.

In figure 1, the roller shaft is hidden by a transverse cover 3.

A flexible shutter 4 is suspended between the two lateral slides 2 by a suspension bar. At its bottom end, the flexible shutter 4 is fitted with a sill bar 6 which is connected by straps 8 to the roller shaft situated in the casing 3. The straps 8 appear through transparent windows 9 made in the shutter 4.

In the following description, by convention the interior will be called the side of the door on which the straps are mounted and exterior will be the side of the door without straps as it appears in figure 1. This corresponds to the usual installation arrangement of these doors. It is however understood that the distinction between interior and exterior is simply to simplify the description of these doors but that the door may of course separate two rooms each situated in one and the same building.

Usually, the shutter 4 has, at regular intervals, sheaths extending across its whole width in which stiffening bars 12 are inserted.

With reference to figure 2 or figure 3, it can be seen that a guide device 14 is disposed in the extension of each of the stiffening bars.

5 The guide device 14 comprises a body of substantially trapezoidal shape having a large base 16 and a small base 17 that are parallel, these two bases being connected first by a semicylindrical wall 18 perpendicular to the two bases and by an oblique  
10 semicylindrical wall.

It is also notable that the body of the guide device consists of two half-shells 20a, 20b molded in a material having a certain elasticity.

15 As clearly shown in figure 3, the large base of the body is fitted with a semicylindrical ring 22 and a rotary roller 23.

20 The semicylindrical ring 22 and the roller 23 are mounted on two shafts 25, 26 sandwiched between the two half-shells 20a, 20b. An important feature, as will be seen hereinafter, is that the semicylindrical ring 22 is situated in the extension of the semicylindrical  
25 wall 18 of the body.

At the small base 16, the body has a blind hole extended by a collar 28.

30 One element to be taken into consideration in the door according to the invention consists of the two lateral slides 2.

As can be seen in cross section in figure 6, each of  
35 the slides has an external flange 28 and an internal flange 29, these two flanges being parallel.

Note also that the slide 2 has an extension 30 toward the outside, perpendicular to the external flange 28.

Another characteristic element of this door consists of the windows 32 made in the shutter at the end of each stiffening bar.

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Note that the shutter has a multilayer structure, especially at the stiffening bars 12. The latter are inserted into a sheath consisting of a strip 34 of flexible material welded onto a nut 35 to form the sheath.

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The door therefore operates as follows.

As can be seen in figure 2 or in figure 3, the guide device 14 is sleeve-jointed onto each end of the stiffening bars 12. The diameter of the blind hole relative to that of the stiffening bar is such that the guide device is free to rotate relative to the stiffening bar 12. The locking in translation of the guide device is achieved by the window 32 since, at its oblique wall, the guide device protrudes beyond this window, but as can be seen in figure 4, is held in the axial direction of the stiffening bar 12 by the edges of the window 32. The guidance of the shutter is then provided by the semicylindrical ring 22 whose flat wall is pressing against the external face of the flange 28 and whose roller 23 is bounded by the face 28 of the external flange and by the external face of the flange 29.

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Thanks to this guide device, it can therefore be seen that the shutter is perfectly guided relative to the slides 2 and that, as shown in figure 5, which shows a cross section of the door between two stiffening bars 12, the shutter 4 is pressed against the external face of the external flange.

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This feature is particularly advantageous when the wind blows since the action of the wind then tends to

flatten the lateral edges of the shutter 4 against each of the flanges 28 with which slides are provided.

It should also be noted that, when the wind blows in a transverse direction, that is to say parallel to the plane of the shutter 4, the extension 30 with which the slides are fitted protects against the ingress of a lateral air current.

If the shutter is raised, the guide device 14 therefore slides relative to the slides 2. A point that is important to note is that the formation of folds in the top part of the door occurs harmoniously partly because the guide devices 14 can pivot relative to the stiffening bars and partly because the semicylindrical rings 22 situated in the extension of the body form with the stiffening bars 12 a semicylindrical element across the whole width of the shutter.

Finally, it should be noted that the door thus defined has a remarkable behavior relative to impacts that it may sustain.

It should specifically be noted that, when the door is acted upon accidentally from the exterior, it offers a possibility of disengaging the end pieces of the slides without irreversible damage to the shutter 4. Specifically, during an accidental action against the shutter 4, the stiffening bar 12 flexes and the guide devices disengage from the slides. This disengagement may occur in two ways. Either the flexing of the bar causes the roller 23 and the semispherical ring 22 to disengage from each of the flanges 28, 29; note in passing that the reaction of two bearing surfaces must be overcome since the semispherical ring 22 is pressing against the external flange 28 and the roller 23 is pressing against the internal flange 29. Or in a second mode of disengagement of the guide device, the disengagement is obtained by the two half-shells 20a,

20b opening relative to one another since, as has been seen, the latter are made of an elastic material. Thus, the end of the stiffening bar may escape from the device by the opening of these two half-shells 20a, 20b  
5 due to their elastic deformation.

During an accidental impact from the interior, the same method of disengagement occurs, since, in this case, only the roller 23 is pressing against the external  
10 flange 28.

Figure 7 represents a variant embodiment in which a roller 39 is inserted into the semicylindrical ring. This roller 39 protrudes beyond the shutter 4 via a specific window made in the latter which allows this  
15 roller 39 to be in contact with the external flange 29. This variant embodiment makes it possible to preserve the integrity of the shutter 4 at its zone of friction against the external flange 28.

20 Figure 8 represents another possible embodiment in which the guide members consist of two rollers 41 oriented in a V-formation one relative to the other, capable of pressing against a rib 42 having a V-section.  
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Figure 9 represents a door having two shutters. According to this embodiment, the latter comprises a guide device that can engage with a stiffener belonging to each of the shutters, having a guide member offset  
30 relative to the plane of each of the shutters. The guide device comprises two semicylindrical rings 22 enclosing a roller 23.

35 In this possible embodiment, a link strut 44 connects two stiffening bars 12 which makes it possible to create an assembly a high inertia whilst having a limited mass.

The door thus described therefore has many advantages since it ensures a lateral guidance of its shutter and a very high degree of lateral seal.

- 5 The invention has been described hereinabove with reference to a nonlimiting exemplary embodiment but it of course embraces all the embodiments. Thus the slides appear to be in two parts, the extension 30 being formed by a fitted cover.